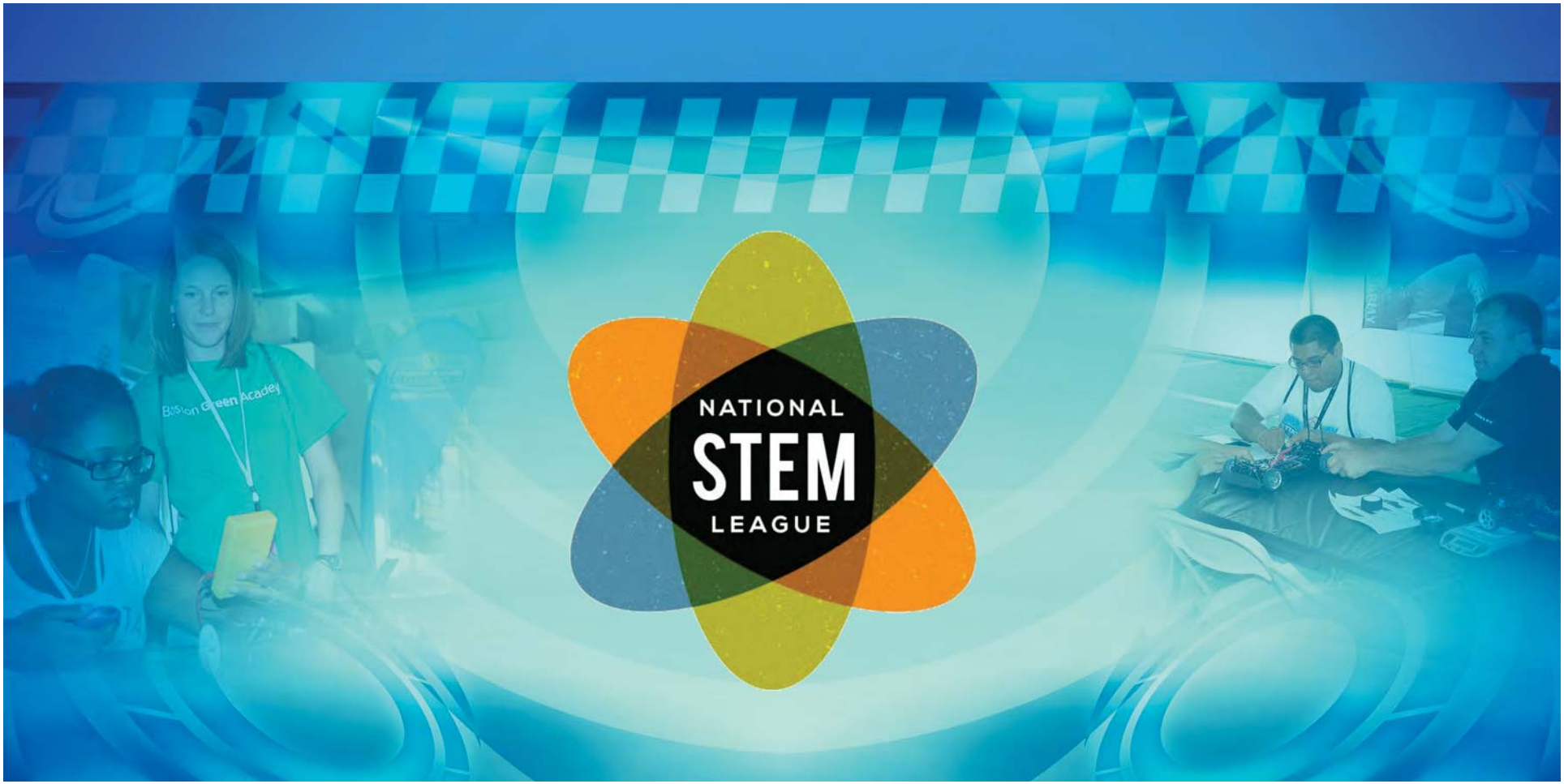
TEN80 EDUCATION

NSL RACING CHALLENGE

NSL ROVER CHALLENGE

NSL ENERGY CHALLENGE

NATIONAL STEM LEAGUE INNOVATION CHALLENGE



Vision & Mission

Vision

Learning is no longer preparation for the job; it *is* the job. Today's students are preparing for a future in which they will invent and reinvent their work, team up to solve problems, develop new knowledge, and continuously acquire new skills.

The engineers and educators of Ten80 know that cultivating a STEM-literate public is critical to America's future and envision a future in which citizen scientists in every community, utilizing the right tools for engagement, partner with educators to empower all young people to understand and maximize their potential as critical thinkers, leaders and productive citizens in a prosperous society.

Mission

Ten80's engineers and educators believe that our society should cultivate STEM literacy and skills with the same rigor, passion and investment that we do for sports. Ten80 is therefore expanding access and participation, especially among non-traditional STEM audiences, to mentors and programs that help each individual cultivate the confidence that comes from knowing how to effectively answer the hard questions, skillfully tackle challenges and innovate toward a sustainable and prosperous future for themselves and for our society.

Goals & Objectives

Ten80's goal is to expand the number of students inspired to engage in STEM learning because it is relevant to their lives and to provide content and support to channel that inspiration into real academic and emotional success in their chosen fields. In other words, it is to change the perception that STEM careers are narrow and lacking in creativity and to ensure students aren't prevented from pursuing a passion or interest because they are 'weeded out' by tough college classes or job requirements they can't meet.

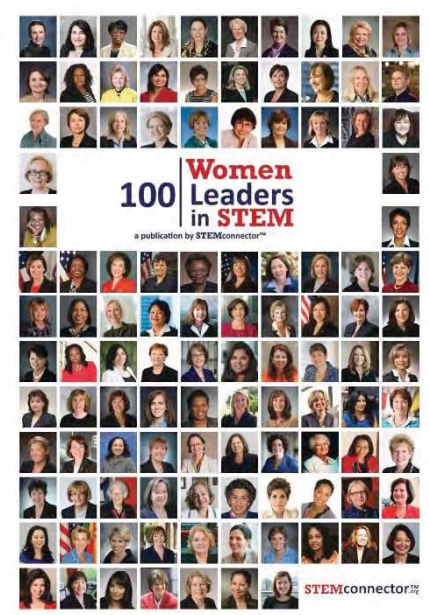
Ten80 is meeting these goals through developing and delivering a practice league for future professionals, the National STEM League, which is the product of over a decade of research-based, student-focused, classroom-tested development that has yielded an exciting approach to project-based learning … that doesn't forget the learning… and doesn't forget the common limitations of science, math and career-technology classrooms.

By supporting the National STEM League, Ten80 and partners are

- Reframing STEM as Something for Everyone
- Delivering the Message to a Growing Audience
- Increasing STEM Capacity

Leaders in STEM

- Change the Equation (CTEq) recently rated Ten80's National STEM League as one of only four programs that are both Exemplary and Scalable.
- Ten80 is a team of engineer-educators who have been developing programs and partnerships for over 15 years to deliver exemplary, customizable and scalable STEM.
- Ten80's founding educator, Beverly Simmons, is one of STEMConnector's 100 Women in STEM.
- Curriculum has been fully aligned to new national education standards by the Director of UNC Charlotte's Center for STEM Education, David Pugalee, Ph.D. who said, "W*ow. There are so many rich opportunities to teach in this curriculum!".*



Leaders in STEM

What Makes a STEM Initiative EXEMPLARY & SCALABLE?

DESIGN PRINCIPLES 3.0 for
Effective STEM Philanthropy

A. Identify and target a compelling and well-defined need.

B. Use rigorous evaluation to continuously measure and inform progress addressing the identified need.

C. Ensure work is sustainable.

D. Demonstrate replicability and scalability

E. Create high-impact partnerships

F. Ensure program capacity to achieve goals

G. Offer STEM content that is challenging and relevant for target audience (supports individual attention for diverse learners)

H. Incorporate and encourage STEM practices (Inquiry and Hands-on Learning)

I. Inspire interest and engagement in STEM

J. Address the need of underrepresented groups

NSL Overview

Practice League for Future Professionals: Students collaborate, create and compete as owners of a business or team specializing in motorsports, energy, rover robotics or combining software and hardware to innovate new things. Throughout the curriculum, students problem solve and optimize performance similar to professional NASCAR teams, NASA engineers and industry innovators.

Curriculum:

- Implemented in STEM electives, Career Technology Education courses, out-of-school clubs, summer camps, math and science focus lessons
- Duration ranges from 1-day STEM Expos to 5 day camps, 6 – 10 week projects, semester, year and multi-year courses.
- Elementary students prepare through classroom, camp and club projects.

Collaboration & Competition: Student groups interact in two ways.

(1) Web-based points race through which STEM professionals provide feedback on student work

(2) Invitationals organized by Sanctioned Officials all over the U.S.

Winners of both compete at a National Finals hosted May of each year.

NSL Overview

Student teams choose their challenge and competitive landscape.

They own a racing, rover, energy or innovation company.

Stay ahead through research & development, called Data Driven Design.

Teams manage and market themselves.

Teams work to enrich their communities in measurable ways.


NSL
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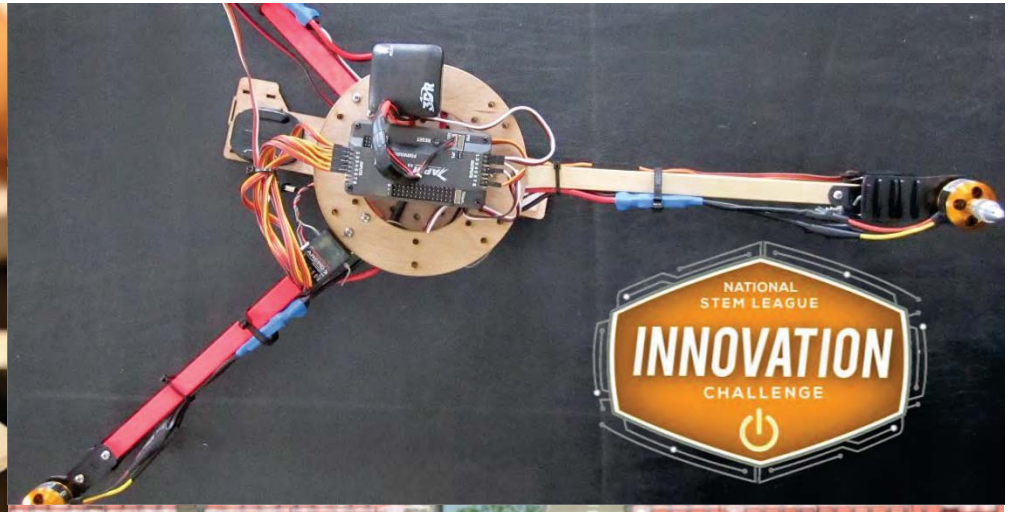
CHALLENGE


NATIONAL
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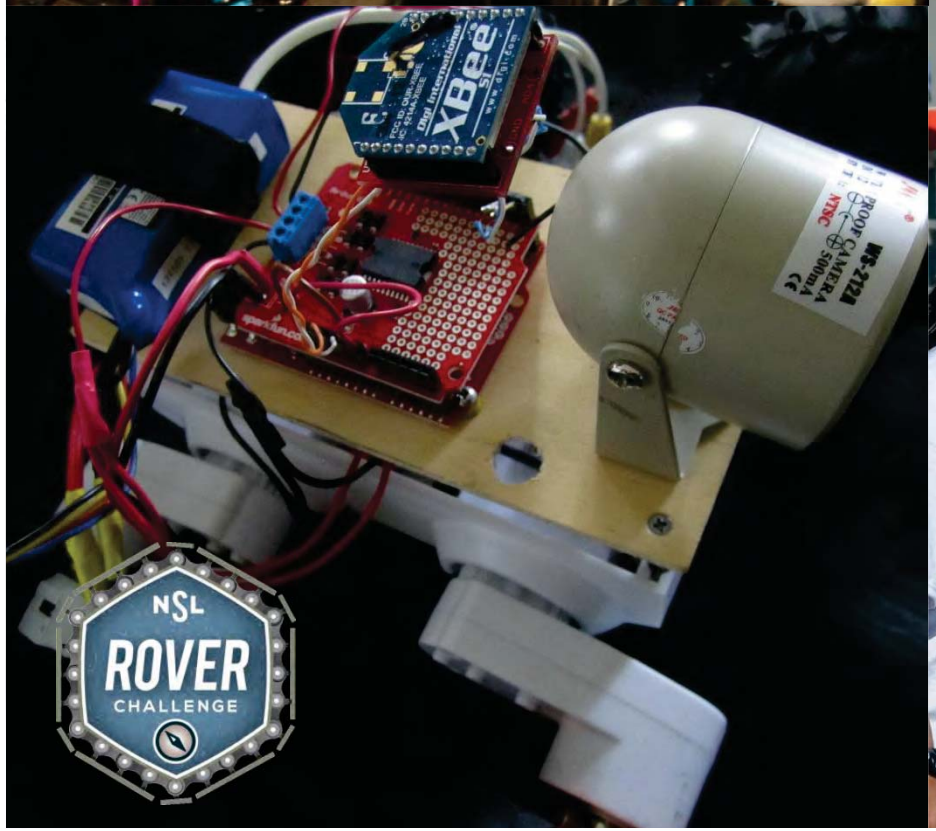

NSL
ROVER
CHALLENGE

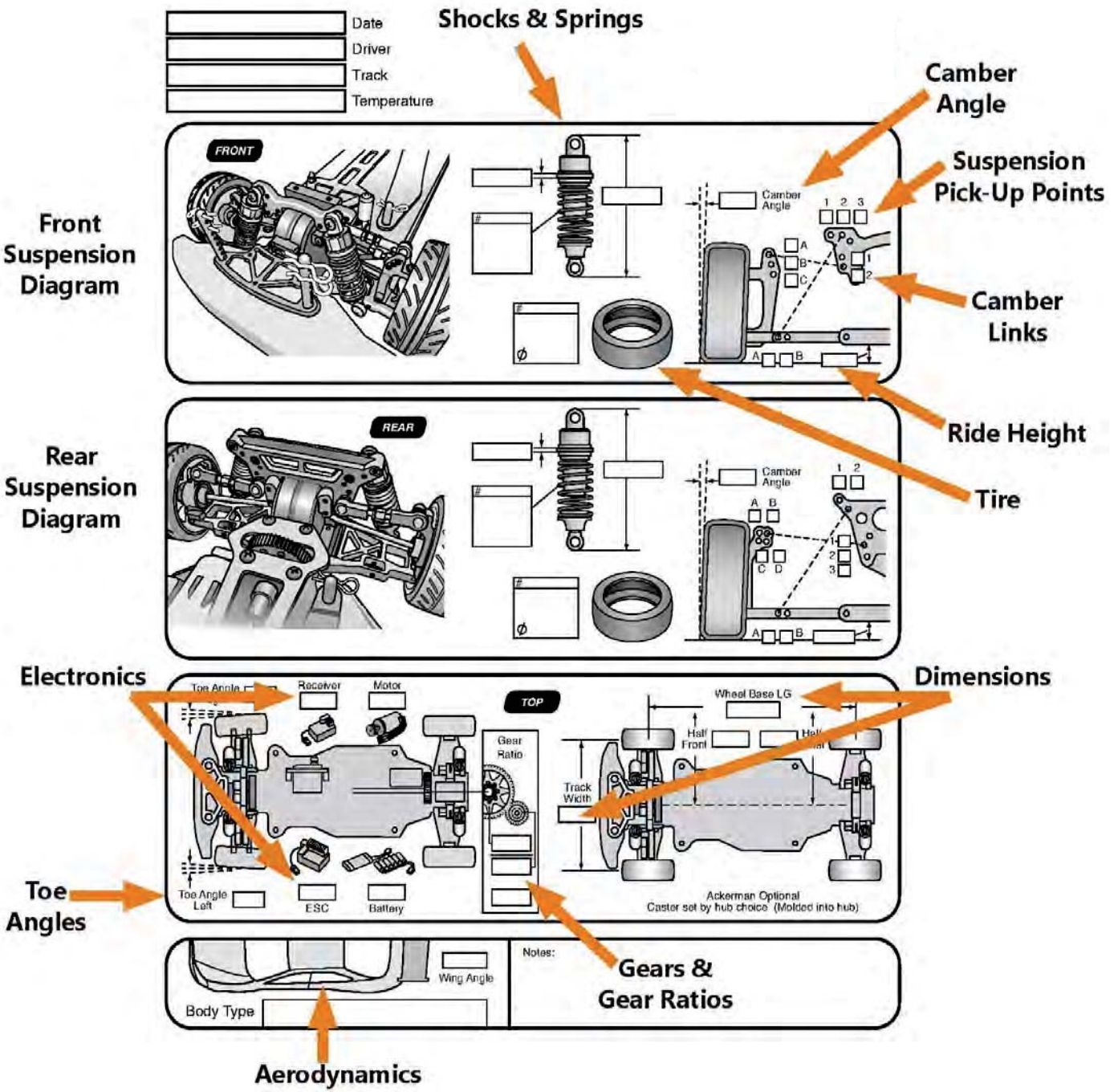

NSL
RACING
CHALLENGE

NATIONAL STEM LEAGUE
RACING
CHALLENGE

Curriculum

Certify…
Students learn the fundamentals of problem solving through data and of mechanical systems.

…then Specialize
Once certified, they specialize into areas that interest them including marketing, management, 3-D CAD, desktop manufacturing, graphic design, etc.



NATIONAL STEM LEAGUE
RACING
CHALLENGE

Competition

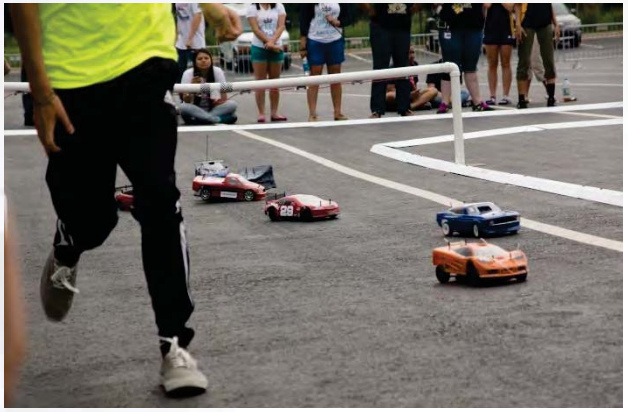
Race Events
A well engineered car, strategy and team will win these high intensity, fast-paced events

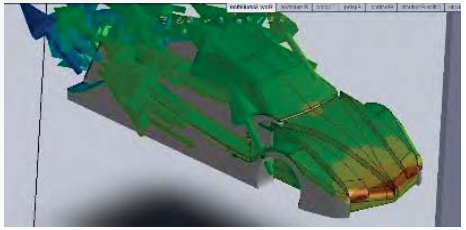
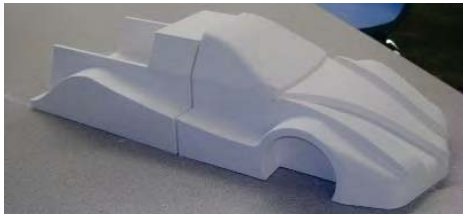
Data-Driven Design
Think of a high-tech STEM fair. Teams showcase projects that may include engineering a renewable energy charging station, improved aerodynamics, chassis re-design or automation through open-source chips such as the Arduino.

Enterprise
Team presentations, graphic design and elevator pitches

Community Outreach
Using 'good investigation practices', teams look to their communities, evaluate a problem or opportunity then craft a way to address it.



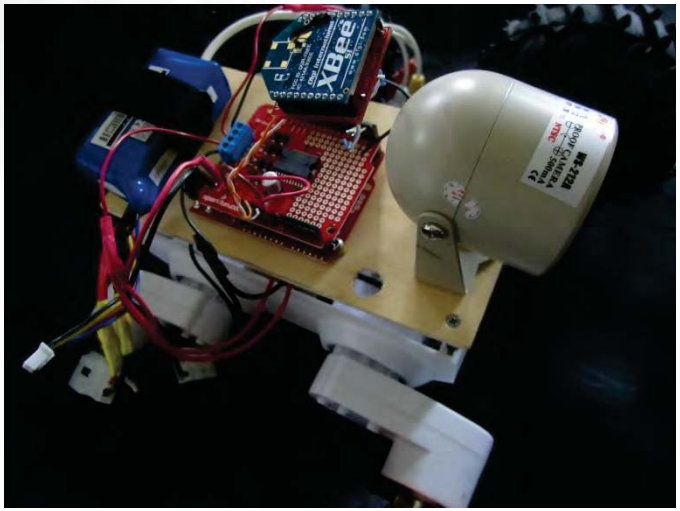



NATIONAL STEM LEAGUE
ROVER
CHALLENGE

Curriculum

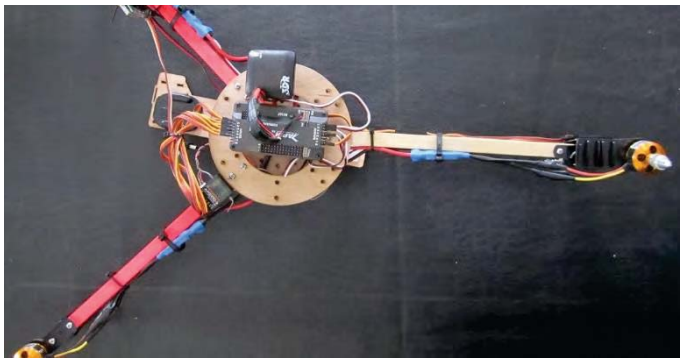
For many, the future of innovation is in the field of automation and robotics. Through these challenges educators help teach students how to teach robots to act more like humans, beginning with the epistemology of robots. The English alphabet has 26 letters. The alphabet for computer languages has two. By mastering the language and learning to work with a variety of open-source hardware and software, students are well on their way to mastering their own futures.



Competition

Through the Rover Challenge, students teach robots to navigate a maze then collaborate and compete head-to-head with other teams in a strategy game.

In 2015, teams will add an unmanned-aerial vehicle scout.



NATIONAL STEM LEAGUE

INNOVATION CHALLENGE

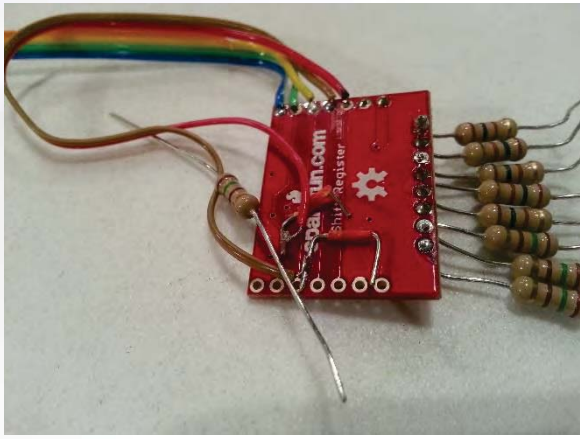
Through the Innovation Challenge, students combine hardware and software to solve a problem or innovate something new the world didn't know it wanted!

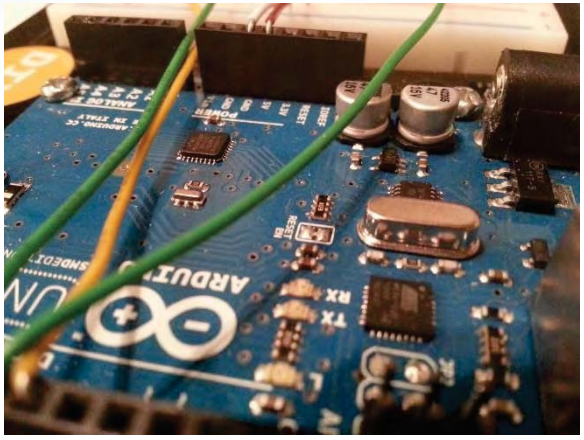
Curriculum

Innovation takes practice. Ideas are relatively easy but learning to turn those ideas into something working, new and interesting is quite a task. Ten80's team and partners offer up a number of projects that help students learn the alphabet of computers and a few different ways to string those two bits – 1 and 0 – together to make ideas into realities.

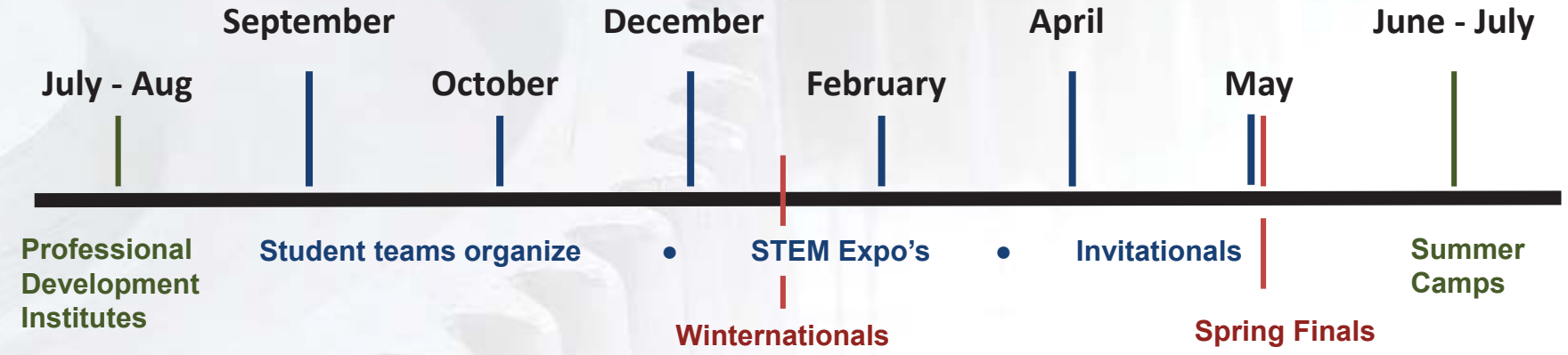
Competition

The Innovation Challenge is a new kind of STEM Fair. Projects are evaluated using a rubric that rewards good investigation practices (GIP). Documentation is NOT optional in the NSL!

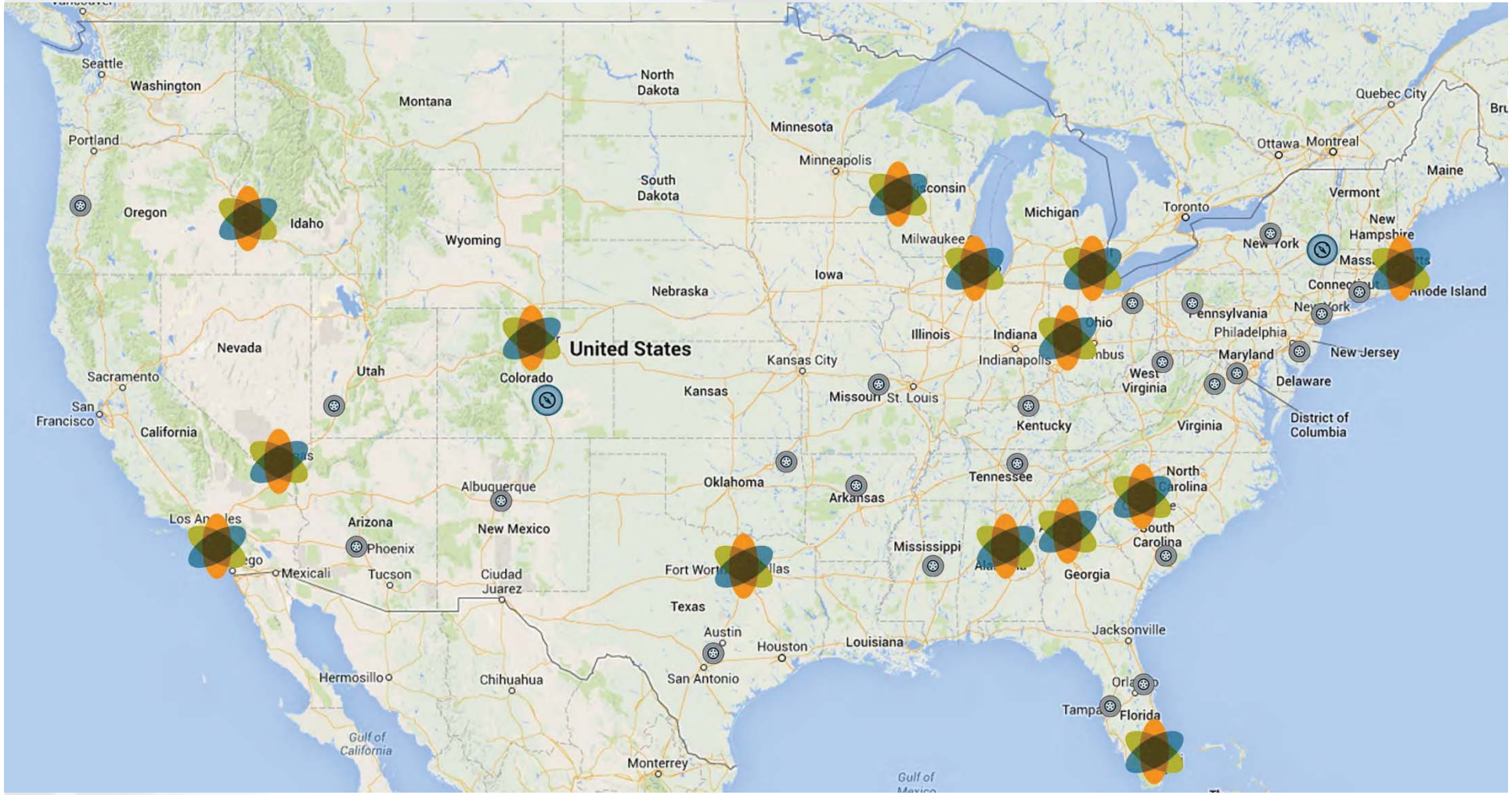




Year-Round Engagement



2014 Hubs & Sanctioned Officials



Ten80 STEM Centers – “Hubs” of Activity

Sanctioned Officials with permissions to operate Invitationals.

Does it work? Yes!

- Change the Equation rated it as Exemplary & Scalable through a rigorous screening process in which fewer than 1 in 3 programs were even accepted as research-driven, results-driven STEM programs and only 4 total were rated as both exemplary and ready to scale.

- The Department of Education report published in 2010 on the Dooly County, GA Safe Schools Healthy Students Federal grant program documented that students working with Ten80 as their major intervention showed higher than a grade level improvement over expectations and **over 5 years the percentage of students passing state graduation tests in science increased from 25% to 85%.**

- Positive results from program pilots in 7 districts in Georgia and Texas show students interacting with Ten80's curriculum and learning under teachers who have been mentored by Ten80 have improved math scores on state tests **(18-20% more students met or exceeded expectations).**

- Results from the RISE initiative out of Charlotte-Mecklenburg School District's Garinger High School in NC have shown that participants engaging in Ten80's curriculum and competing in the Ten80 Student Racing Challenge are motivated to stay in school and refrain from risky behaviors. **The police department funded by the attorney general's office has funded over 100 students to take part and only 2 have dropped out without making significant progress in academics.** This STEM initiative is also a gang prevention success.

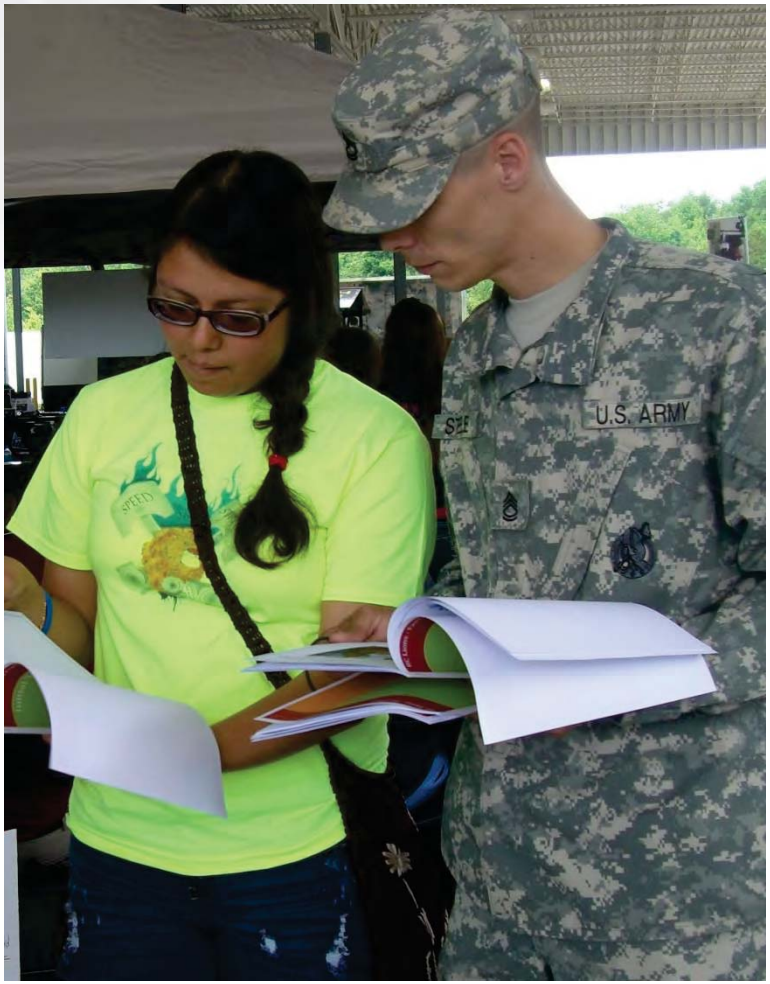
- **Statistically significant increases in science scores** were documented for the 120 students in Ten80's founding educator's middle school team that was studied by the University of GA (1996) over a 3 year longitudinal study.

Testimonials

"With Student Racing Challenge, it is the first time I have had hands on problems my students wanted and needed to solve that really required math as part of the solution. They can get to the answer using data and simple algebra but the use of a regression analysis makes everything simpler. Calculus making something simpler seems like an impossibility to most people. That is a great concept for me as the teacher."
Michelle Bonds, Calculus Teacher and Student Racing Challenge Coach
Bald Knob, AR

"I have never seen my students work so hard. The students who are younger, in algebra, drop by and ask how they can do this Racing Challenge thing? It is always the perfect time to say they need to do well in their math classes and make it to calculus. I am hoping the program will spread to lower grades now that other teachers see what it can do for students."
Elizabeth Collins, Calculus Teacher
Charlotte, NC

"Ten80's challenges engage students in such a way that students seek out learning about Mathematics and Science. This is a very unique quality that many seek but few achieve. This program engages students in such a way that students seek out learning about Mathematics and Science. This is a very unique quality that many seek but few achieve. To take something so "fun" and create a curriculum around it is a daunting task and rarely ever done with such skill and success. Ten80 has found the key and managed to create and inspire students to become interested in the Science and Math behind the racecar."
Dr. Judy Mirick, Physics Instructor
Los Angeles, CA



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